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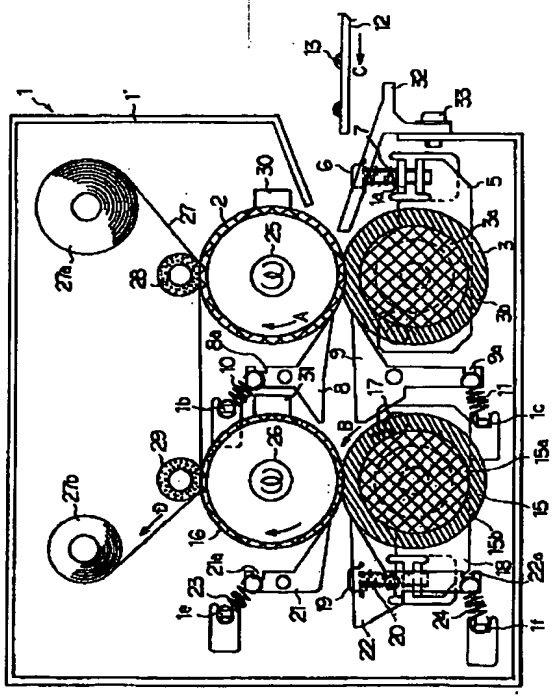
(54)【発明の名称】　画像形成装置

(57)【要約】

【目的】　画像ズレ、特にベタ黒画像のズレを発生させることなく安定した高画質画像を得ることができる画像形成装置を提供すること（第１発明）。

【構成】　画像形成装置の定着装置１において、記録材１２の進行方向に沿って定着ローラ対を２対以上配設し、該定着ローラ対の定着ローラ２，１６の総加圧力が記録材１２の進行方向に順次大きくなるよう構成する（第１発明）。第１発明によれば、記録材１２が進むに従って、定着ローラ対での総加圧力が順次大きくなるため、定着ローラ１２を含む最初の定着ローラ対では記録材１２上の未定着現像剤像に大きなストレスをかけず、僅かに定着させ、続いて定着ローラ１６を含む次の定着ローラ対では総加圧力が大きい状態で更に定着させることとなり、画像ズレ、特にベタ黒画像のズレを発生させることなく安定した高画質画像を得ることができる。



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【特許請求の範囲】

【請求項１】　互いに圧接して回転自在に配設した定着ローラと加圧ローラから成る定着ローラ対の間に、未定着現像剤像を担持する記録材を通して定着を行なう定着装置を備える画像形成装置において、前記記録材の進行方向に沿って前記定着ローラ対を２対以上配設し、該定着ローラ対の総加圧力が記録材の進行方向に沿って順次大きくなるよう構成したことを特徴とする画像形成装置。

【請求項２】　前記各定着ローラ対の加圧ローラは加圧手段によって定着ローラに圧接され、加圧手段の力が記録材の進行方向に沿って順次大きくなるよう構成したことを特徴とする請求項１記載の画像形成装置。

【請求項３】　前記各定着ローラ対の加圧ローラはゴムで構成され、該加圧ローラのゴムの硬度が記録材の進行方向に沿って順次大きくなるよう構成したことを特徴とする請求項１記載の画像形成装置。

【請求項４】　前記各定着ローラ対の加圧ローラはゴムで構成され、該加圧ローラのゴムの肉厚が記録材の進行方向に沿って順次小さくなるよう構成したことを特徴とする請求項１記載の画像形成装置。

【請求項５】　前記各定着ローラ対の定着ローラと加圧ローラ間に形成されるニップの幅が記録材の進行方向に沿って順次小さくなるよう構成したことを特徴とする請求項１記載の画像形成装置。

【請求項６】　互いに圧接して回転自在に配設した定着ローラと加圧ローラから成る定着ローラ対の間に、未定着現像剤像を担持する記録材を通して定着を行なう定着装置を備える画像形成装置において、前記記録材の進行方向に沿って前記定着ローラ対を２対以上配設し、該定着ローラ対の定着ローラの逆クラウン量が進行方向に沿って順次大きくなるよう構成したことを特徴とする画像形成装置。

【請求項７】　互いに圧接して回転自在に配設した定着ローラと加圧ローラから成る定着ローラ対の間に、未定着現像剤像を担持する記録材を通して定着を行なう定着装置を備える画像形成装置において、前記記録材の進行方向に沿って前記定着ローラ対を２対以上配設し、該定着ローラ対の定着ローラの直径が記録材の進行方向に沿って順次大きくなるよう構成したことを特徴とする画像形成装置。

【請求項８】　互いに圧接して回転自在に配設した定着ローラと加圧ローラから成る定着ローラ対の間に、未定着現像剤像を担持する記録材を通して定着を行なう定着装置を備える画像形成装置において、前記記録材の進行方向に沿って前記定着ローラ対を２対以上配設し、該定着ローラ対の定着ローラの熱容量が記録材の進行方向に沿って順次大きくなるよう構成したことを特徴とする画像形成装置。

【請求項９】　前記定着ローラの熱源の熱容量が記録材

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の進行方向に沿って順次大きくなるよう構成したことを特徴とする請求項１記載の画像形成装置。

【請求項１０】　前記定着ローラの肉厚が記録材の進行方向に沿って順次大きくなるよう構成したことを特徴とする請求項１記載の画像形成装置。

【発明の詳細な説明】

【０００１】

【産業上の利用分野】本発明は、複写機、ファクシミリ、レーザビームプリンタ等の画像形成装置に関する。

【０００２】

【従来の技術】従来、電子写真方式を採る画像形成装置では、未定着の現像剤の記録材への定着方式として熱定着方式が多く使われている。

【０００３】ところで、近年、複写機の普及に伴ってコピーの使用枚数が増加し、加えてオフィスの省力化、自動化の所謂ＯＡ（オフィスオートメーション）化の進展によって複写処理スピード（コピースピード）の速い複写機が要求されてきており、特に、コピースピード５０枚／分以上の高速機、更には１００枚／分以上の超高速機が普及するに至っている。

【０００４】

【発明が解決しようとする課題】ところが、上記高速機や超高速機における熱定着器には定着性の確保が要求されるため、定着ローラはその肉厚や径が大きくなり、熱容量も大きくなり、更には、その定着ローラに十分な熱エネルギーを与えるために大きなワッテージのハロゲンヒータが必要であり、ウェイトタイムが長くなったり、装置の消費電力が大きくなる他、装置も大型化するという問題があった。

【０００５】そして、画像形成装置が大型化すると、そのメンテナンスが複雑化し、更には設置スペースやメンテナンススペースの確保が困難となり、小型でメンテナンスの容易な高速機、超高速機の提案が望まれていた。

【０００６】特に、ウェイトタイムはユーザーにとっては不要で無駄な時間であり、高速機や超高速機において定着性を損なうことがなく、ウェイトタイムの短縮が可能な締着装置の出現が強く望まれていた。

【０００７】又、近年のＯＡ化の進展により、複写機の機能が多機能化してきており、両面コピーや多重コピーの機能が多く使われてきている。この両面多重機能は、高速機や超高速機等には標準的に装備されており、又、コピースピードが２０～４０枚／分の中低速機でも標準装備若しくはオプション対応で装備されている。この両面・多重コピー動作には、記録材に画像形成させた後に中間トレイに該記録材を一旦スタックし、その記録材の裏面若しくは同一面に再度画像形成させて定着を行なう工程が含まれている。

【０００８】ところで、従来の熱定着方式では、熱と加圧力によって必ず記録材にカールが発生し、その記録材のカール方向やカール量は環境や紙種或いはサイズ等で

バラツキが大きく、記録材を中間トレイに収納スタックさせる際に、該記録材がカールで丸まって収納できなかったり、先端部が折れたり、搬送途中でジャムしたり、再給紙の際にカールの影響で２面目の画像形成時に再転写が発生したり、転写抜けが発生したりして画像品質が低下することがあった。

【０００９】又、定着器を通過した記録材が機外に排出されて、ソーターやフィニッシャーやトレイ等に収納される際にも、カールによって該記録材の収納不良やジャム等が発生することがあった。

【００１０】上述のように、両面多重機能を十分に満足させることは容易でなく、このため今までに種々のカール防止手段等が考案されているが、何れも十分とは言えず、カールの少ない信頼性の高い両面多重機能を装備した装置の出現が強く望まれていた。

【００１１】更に、最近では地球環境保護のエコロジーの立場から、森林資源の確保のために再生紙がコピー紙として使われ始めてきており、加えて、先の両面多重機能によって紙の表裏に画像形成が可能なためにコピー紙を極力減らすことが可能となり、再生紙を使用しての両面コピーや多重コピーが多く用いられるようになってきている。

【００１２】ところが、再生紙はその紙繊維が何回かの処理工程によってダメージを受け、紙の腰（剛性）が弱くなっており、更に紙繊維のスキ目方向のバラツキ具合を示す配向角度が大きく、繊維の方向性が一様でないため、通常のコピー紙に比べて、熱定着方式における熱と加圧力によってカール量が大きく、搬送性が著しく劣る欠点を有している。加えて、両面多重機能を装備している画像形成装置においては、先に説明したカールに起因する様々な欠点がより顕著になり、再生紙等を含めたより多くの記録材に対する信頼性のラチチュードを高めた画像形成装置の出現が強く望まれていた。

【００１３】従って、第１及び第２発明の目的とする処は、画像ズレ、特にベタ黒画像のズレを発生させることなく安定した高画質画像を得ることができる画像形成装置を提供することにある。

【００１４】又、第３及び第４発明の目的とする処は、記録材のカール発生量を小さく抑えて再生紙等を含めた各種記録材に対する搬送性のラチチュードを拡大することができ、特に両面多重機能を含めた信頼性を高めることができる画像形成装置を提供することにある。

【００１５】

【課題を解決するための手段】上記目的を達成すべく第１発明は、互いに圧接して回転自在に配設した定着ローラと加圧ローラから成る定着ローラ対の間に、未定着現像剤像を担持する記録材を通して定着を行なう定着装置を備える画像形成装置において、前記記録材の進行方向に沿って前記定着ローラ対を２対以上配設し、該定着ローラ対の総加圧力が記録材の進行方向に沿って順次大きくなるよう構成したことをその特徴とする。

【００１６】第２発明は、互いに圧接して回転自在に配設した定着ローラと加圧ローラから成る定着ローラ対の間に、未定着現像剤像を担持する記録材を通して定着を行なう定着装置を備える画像形成装置において、前記記録材の進行方向に沿って前記定着ローラ対を２対以上配設し、該定着ローラ対の定着ローラの逆クラウン量が進行方向に沿って順次大きくなるよう構成したことをその特徴とする。

【００１７】第３発明は、互いに圧接して回転自在に配設した定着ローラと加圧ローラから成る定着ローラ対の間に、未定着現像剤像を担持する記録材を通して定着を行なう定着装置を備える画像形成装置において、前記記録材の進行方向に沿って前記定着ローラ対を２対以上配設し、該定着ローラ対の定着ローラの直径が記録材の進行方向に沿って順次大きくなるよう構成したことをその特徴とする。

【００１８】第４発明は、互いに圧接して回転自在に配設した定着ローラと加圧ローラから成る定着ローラ対の間に、未定着現像剤像を担持する記録材を通して定着を行なう定着装置を備える画像形成装置において、前記記録材の進行方向に沿って前記定着ローラ対を２対以上配設し、該定着ローラ対の定着ローラの熱容量が記録材の進行方向に沿って順次大きくなるよう構成したことをその特徴とする。

【００１９】

【作用】一般的に定着ローラは記録材のシワ発生防止のため逆クラウン形状に成形されており、その逆クラウン形状と加圧ローラによる総加圧力によって記録材にストレスを生じさせてシワの発生を防止するようにしている。

【００２０】又、定着ローラと加圧ローラとを圧接する総加圧力が大きい（つまり、加圧手段の力が大きい）とき、加圧ローラを構成するゴムの硬度が大きいとき、或いはニップ幅が小さいときには、記録材へのストレスの発生が大きくなって記録材にシワが発生しにくい。

【００２１】ところで、シワ発生の現象は画像ズレの現象と表裏の関係にある。即ち、加圧手段の力が大きくて総加圧力が大きいとき、加圧ローラのゴム硬度が大きいとき、或いはニップ幅が小さいときには、記録材にシワが発生しないが、記録材上にストレスがかかることで、記録材上の未定着現像剤像が乱され、特にベタ黒画像ではその傾向が顕著となり、画像ズレの原因となる。

【００２２】而して、第１発明によれば、記録材が順次進むに従って、定着ローラと加圧ローラを互いに圧接するための総加圧力が順次大きくなるため、最初の定着ローラ対では記録材上の未定着現像剤像に大きなストレスをかけず、僅かに定着させ、続いて次の定着ローラ対では総加圧力が更に大きい状態で更に定着させることとなり、画像ズレ、特にベタ黒画像のズレを発生させること

なく安定した高画質画像を得ることができる。

【００２３】又、第２発明によれば、記録材が順次進むに従って、定着ローラの逆クラウン量が順次大きくなっていくため、最初の定着ローラ対では記録材上の未定着現像剤像に大きなストレスをかけないで定着を行なうことができ、続いて次の定着ローラ対では定着ローラの逆クラウン量が更に大きい状態で定着が行なわれ、この結果、画像ズレ、特にベタ黒画像のズレを発生させることなく、安定した高画質画像を得ることができる。

【００２４】ところで、一般的に、熱ローラ定着方式において、定着した記録材のカール発生の原因の１つに定着ローラの直径（曲率）が大きく関与しており、通常、定着ローラ直径が小さくて曲率の大きな定着ローラでは記録材のカール量は大きく、その逆に定着ローラ直径が大きくて曲率の小さな定着ローラでは記録材のカール量は小さい。

【００２５】而して、第３発明によれば、記録材が順次進むに従って、定着ローラ直径が順次大きくなる（曲率が順次小さくなる）ため、記録材のカール発生量を小さく抑えることができ、その結果、再生紙等を含めた多くの記録材に対する搬送性のラチチュードを拡大することができ、特に両面多重機能を含めた装置全体の大幅な信頼性向上を実現することができる。

【００２６】又、一般的に、熱ローラ定着方式において定着した記録材のカール発生の原因の１つに定着ローラの熱容量（具体的には、定着ローラと加圧ローラの少なくとも一方に内蔵されている熱源の熱容量、又は定着ローラの肉厚）が大きく関与しており、通常、定着ローラの熱容量が大きい場合（つまり、熱源のワッテージが大きい場合、或いは定着ローラの肉厚が大きい場合）には、記録材の受ける熱も大きくなり、熱による紙繊維の収縮及び熱による現像剤の収縮に伴うバイメタル作用が働いて記録材のカール量が大きくなる。特に急激な温度差の熱を与えた場合には、記録材のカール量は通常より大きくなり、逆に定着ローラの熱容量が小さい場合は、記録材のカール量が小さくなる。

【００２７】而して、第４発明によれば、記録材が順次進むに従って、定着ローラの熱容量が順次大きくなるため、最初の定着ローラ対において記録材に急激な熱を与えることがなく、最初の定着ローラ対では記録材に小さな熱量が与えられ、次の定着ローラ対では大きな熱量が順次記録材へ与えられるため、記録材には急激な熱による大きなカールの発生はなく、記録材のカール量を小さく抑えることができ、その結果、再生紙等を含めた各種記録材に対する搬送性のラチチュードを拡大し、特に両面多重機能を含めた装置全体の大幅な信頼性向上を実現することができる。

【００２８】

【実施例】

［第１発明］以下に第１発明の実施例を添付図面に基づいて説明する。

【００２９】＜第１実施例＞図１は本発明に係る画像形成装置の定着装置１の断面図であり、該定着装置１は、図示矢印Ａ方向に回転する定着ローラ２と、該定着ローラ２とのニップを形成するように圧接して配設された加圧ローラ３を有している。尚、定着ローラ２は、不図示の軸受で回転自在に支持されている。

【００３０】上記定着ローラ２は、アルミニウムや鉄系の金属材料で構成されており、その芯金の肉厚はt_1、外径はϕD_1にそれぞれ設定されている。そして、該定着ローラ２の表面は、トナーの付着を防止するために、テフロン（商標）等のフッ素系樹脂でコーティングされている。

【００３１】一方、前記加圧ローラ３は、芯金部３ａとゴム部３ｂとで構成されており、その外径はϕD_1'で、ゴム部３ｂの厚さはt_1'硬度はH_{s1}にそれぞれ設定されている。そして、この加圧ローラ３は、回転軸４を中心として回動する加圧アーム５に不図示の軸受を介して回転自在に支持されており、該加圧アーム５の他端は、ネジ６に係合し、定着装置１の枠体１'の一部に形成された突起１ａとバネ力p_1を有した加圧バネ７によって付勢されている。従って、加圧ローラ３には総加圧力P_1が付与され、該加圧ローラ３は定着ローラ２に圧接して定着ローラ２との間に幅T_1のニップを形成している。

【００３２】又、定着ローラ２と加圧ローラ３には、それぞれ分離爪８，９が設けられており、これらの分離爪８，９の各一端８ａ，９ａにはバネ１０，１１がそれぞれ係合しており、各バネ１０，１１の他端は定着装置１内の固定端１ｂ，１ｃに係合しており、これによって分離爪８，９が定着ローラ２と加圧ローラ３にそれぞれ所定圧で当接している。

【００３３】而して、該定着装置１においては、図１の右側より紙１２が不図示の搬送部によって左側へ搬送されて来る。尚、紙１２上には未定着現像剤像１３が形成されている。

【００３４】そして、定着装置１には上記紙１２の搬送方向に沿って左側に加圧ローラ１５と定着ローラ１６が配設されている。加圧ローラ１５は図示矢印Ｂ方向に回転駆動され、該加圧ローラ１５に定着ローラ１６が圧接して両者間にニップが形成されている。ここで、定着ローラ１６は、不図示の軸受によって回転自在に支持されている。

【００３５】上記加圧ローラ１５は、円筒状の芯金部１５ａとゴム部１５ｂとで構成されており、その外径はϕD_2'、ゴム部１５ｂの厚さはt_2'、ゴム硬度はH_{s2}にそれぞれ設定されている。そして、この加圧ローラ１５は、回転軸１７を中心として回動する加圧アーム１８に不図示の軸受を介して回転自在に支持されており、該加圧アーム１８の他端はネジ１９に係合し、定着装置１

の枠体１’一部の突起１ｄとバネ力p_2を有した加圧バネ２０によって付勢されている。従って、加圧ローラ１５には総加圧力P_2が付与され、該加圧ローラ１５は定着ローラ１６に圧接して定着ローラ１６との間に幅T_2のニップを形成している。

【００３６】一方、定着ローラ１６は、前記定着ローラ２と同様に構成されており、アルミニウムや鉄系の金属材料で構成され、その芯金の肉厚はt_2、外径はϕD_2に設定されている。

【００３７】又、加圧ローラ１５と定着ローラ１６には、それぞれ分離爪２１，２２が設けられており、分離爪２１，２２の各一端２１ａ，２２ａにはバネ２３，２４がそれぞれ係合しており、それぞれのバネ２３，２４の他端は定着装置１内の固定端１ｅ，１ｆに係合しており、これによって各分離爪２１，２２は加圧ローラ１５、定着ローラ１６にそれぞれ所定圧で当接している。

【００３８】更に、定着ローラ２と定着ローラ１６の内部には、その長手方向に延びるハロゲンヒータ２５，２６がそれぞれ配設されており、ハロゲンヒータ２５，２６はそれぞれW_1，W_2のワッテージを有しており、それらで発生する熱が定着ローラ２，１６を介して、図示矢印Ｃ方向に進行して来る紙１２上の未定着現像剤像１３に作用し、現像剤像１３が紙１２上に定着される。

【００３９】又、定着ローラ２及び定着ローラ１６には、所定量のオイルを含油したウェブ２７がウェブローラ２８，２９を介して当接しており、定着ローラ２，１６の表面上の残留現像剤はウェブ２７によって除去される。ウェブ２７は、供給側２７ａより定量的に送り出され、巻き取り側２７ｂにより図示Ｄ矢印方向へ巻き取られ、該ウェブ２７によってオフセットの発生が防がれる。

【００４０】更に、ハロゲンヒータ２５，２６が設けられている定着ローラ２と定着ローラ１６には、それぞれの表面上の温度を制御するために、温度検知器であるサーミスタ３０，３１が定着ローラ２，１６に所定圧で当接せしめられている。

【００４１】一方、定着装置１の枠体１’には、紙１２を定着ローラ２側へ案内搬送するための入口ガイド３２がビス３３で取り付けられており、紙１２を定着ローラ２の側へ当接、進入させることで右側の定着ローラ対（定着ローラ２と加圧ローラ３）による紙１２のシワの発生を防いでいる。

【００４２】ここで、定着装置１を備える画像形成装置を図２に基づいて説明する。尚、図２は画像形成装置要部の構成図である。

【００４３】図２において、１００は矢印Ｊ方向に回転する円筒状の潜像担持体である感光ドラムであり、該感光ドラム１００の上方には一次帯電器１０１が配設されている。

【００４４】而して、感光ドラム１００の表面は一次帯電器１０１によって一様に帯電され、該表面は露光ビーム１０２によって露光され、感光ドラム１００の表面上には静電潜像が形成される。そして、この静電潜像は、感光ドラム１００の回転方向に順次配設された現像装置１０３，１０４の何れか又は双方によってトナー像として現像される。尚、一方の現像装置１０３には非磁性の有彩色トナーが収納されており、他方の現像装置１０４には磁性の黒色トナーが収納されているため、多色のコピーが可能である。

【００４５】上記トナー像は、感光ドラム１００の回転に伴って該感光ドラム１００の下方の転写帯電器１０５が配された転写部に到来する。転写部には、カセットＣ１，Ｃ２の何れかから選択的に取り出された記録材１２が搬送路１０６を通って進行し、該記録材１２はレジストローラ対１０７によって制御されて感光ドラム１００上のトナー像とタイミングを合せて搬送され、該記録材１２上には転写帯電器１０５によってトナー像が転写される。

【００４６】次に、前記転写帯電器１０５と並んで配設された分離帯電器１０８によって、転写時に記録材１２に付与された電荷が除電されて記録材１２は感光ドラム１００から分離し、定着装置１に搬送されてここでトナー像の定着を受ける。

【００４７】以上のような本画像形成装置において片面コピーを行なう場合には、図２に実線で示す位置にフラッパＦ１を設定して記録材１２をそのまま矢印Ｅ方向に搬送して機外に排出すれば良い。

【００４８】一方、両面或いは多重コピーを実行する際には、フラッパＦ１を図２に二点鎖線で示す位置に設定し、定着装置１から出た記録材１２を矢印Ｇ方向に搬送する。そして、両面コピーの場合は更にフラッパＦ２を図２に実線にて示す位置に設定して該記録材１２を中間トレイ１１１に一旦収納した後、該中間トレイ１１１から記録材１２を取り出してこれを矢印Ｈに沿って搬送し、該記録材１２をその第二面が感光ドラム１００に対向するような向きにして搬送路１０６に再度供給する。このときまでに感光ドラム１００に形成されているトナー像を前記と同様の手法で記録材１２上に転写し、この記録材１２が定着装置１を通過するまでにフラッパＦ１を図２に実線で示す位置に切り換え、定着の終了した記録材１２を図示矢印Ｅ方向に搬送して機外に排出する。

【００４９】又、記録材１２の片面に多重コピーを行な場合には、フラッパＦ２を図２に二点鎖線で示す位置に設定し、第一面コピー終了後に矢印Ｇ方向に進行する記録材１２をそのまま図示矢印Ｈ方向に進行させてこれを搬送路１０６に供給し、前記と同様に２回目以降の画像形成動作を実行すれば良い。

【００５０】ところで、本実施例においては、定着ローラ２側の定着ローラ対での総加圧力P_1は、加圧バネ７のバネ力p_1によって決定されていて$P_1 = p_1 = 20$

Ｋｇに設定され、定着ローラ１６側の定着ローラ対での総加圧力P_2は、加圧バネ２０のバネ力p_2によって決定されていて$P_2 = p_2 = 30$Ｋｇに設定されている。

【００５１】従って、本実施例では、定着ローラ対での総加圧力が記録材１２の進行方向に沿って順次大きくなるよう構成されており、定着ローラ１６側の定着ローラ対における総加圧力P_2が定着ローラ２側の定着ローラ対における総加圧力P_2よりも大きく（$P_2 > P_1$）設定されている。

【００５２】ところで、一般に定着ローラと加圧ローラとを圧接する総加圧力が大きい（つまり、加圧手段の力が大きい）ときには、記録材へのストレスの発生が大きくなって記録材にシワが発生しにくい。

【００５３】一方、シワ発生の現象は画像ズレの現象と表裏の関係にある。即ち、加圧手段の力が大きくて総加圧力が大きいときには、記録材上にストレスがかかることで、記録材上の未定着現像剤像が乱され、特にベタ黒画像ではその傾向が顕著となり、画像ズレの原因となる。

【００５４】而して、本実施例によれば、前述のように定着ローラ１６側の定着ローラ対における総加圧力P_2が定着ローラ２側の定着ローラ対における総加圧力P_2よりも大きく（$P_2 > P_1$）設定されているため、定着ローラ２を含む最初の定着ローラ対では記録材１２上の未定着現像剤像に大きなストレスをかけず、僅かに定着させ、続いて定着ローラ１６を含む次の定着ローラ対では更に大きな加圧力で更に定着させることとなり、画像ズレ、特にベタ黒画像のズレを発生させることなく安定した高画質画像を得ることができる。

【００５５】＜第２実施例＞次に、本発明の第２実施例を同様に図１を用いて説明する。

【００５６】本実施例に係る定着装置１では、加圧ローラ３と加圧ローラ１５のゴム部３ｂ，１５ｂの硬度H_{s1}，H_{s2}のみが異なり、その他は前記第１実施例と同様である。

【００５７】一般的に、ゴム硬度の大きさに比例して総加圧力も大きくなることが知られている。

【００５８】本実施例では、定着ローラ２側の定着ローラ対での総加圧力P_1は加圧ローラ３のゴム部３ｂの硬度H_{s1}によって決定されていて$H_{s1} = 40°$であり、定着ローラ１６側の定着ローラ対での総加圧P_2は、加圧ローラ１５のゴム部１５ｂの硬度H_{s2}で決定され、$H_{s2} = 50°$（$> H_{s1}$）であるため、前記第１実施例と同様に、定着ローラ１６側の定着ローラ対での総加圧力P_2が定着ローラ２側の定着ローラ対での総加圧力P_1よりも大きく（$P_2 > P_1$）なる。従って、本実施例においても、第１実施例と同様の効果が得られる。

【００５９】＜第３実施例＞本発明の第３実施例を図３に従って説明する。

【００６０】本実施例に係る定着装置１においては、加圧ローラ３と加圧ローラ１５の各ゴム部３ｂ，１５ｂの肉厚t_1'，t_2'のみが異なり、その他は第１実施例に係る定着装置１と同一である。

【００６１】一般的に、ゴムの肉厚が小さい（薄い）程、見掛けのゴム硬度は大きくなり、ゴムで構成される加圧ローラの総加圧力も大きくなることが知られている。

【００６２】而して、本実施例では、定着ローラ２側の定着ローラにおける総加圧力P_1は加圧ローラ３のゴム部３ｂの見掛けの硬度、つまり、ゴム部３ｂの肉厚t_1'によって決定されてt_1' ＝７ｍｍであり、定着ローラ１６側の定着ローラにおける総加圧力P_2は加圧ローラ１５のゴム部１５ｂの見掛けの硬度、つまり、ゴム部１５ｂの肉厚t_2'によって決定されてt_2' ＝５ｍｍ（$< t_1$'）に設定されているため、前記第１及び第２実施例と同様に、定着ローラ１６側の定着ローラ対での総加圧力P_2が定着ローラ２側の定着ローラ対での総加圧力P_1よりも大きく（$P_2 > P_1$）なる。従って、本実施例においても、第１実施例と同様の効果が得られる。

【００６３】＜第４実施例＞本発明の第４実施例を図４に基づいて説明する。

【００６４】本実施例では、定着ローラ２と加圧ローラ３及び定着ローラ１６と加圧ローラ１５との圧接によって生ずるニップの幅T_1，T_2のみ異なり、その他は第１実施例に係る定着装置１と同一である。

【００６５】一般的に定着ローラ対における定着ローラと加圧ローラ間のニップの幅が小さいと、総加圧力は大きくなることが知られている。

【００６６】而して、本実施例では、定着ローラ２側の定着ローラ対における総加圧力P_1はニップ幅T_1で決定されて$T_1 = 5$ｍｍに設定され、定着ローラ１６側の定着ローラ対における総加圧力P_2はニップ幅T_2で決定されて$T_2 = 3$ｍｍ（$< T_1$）に設定されているため、前記第１乃至第３実施例と同様に、定着ローラ１６側の定着ローラ対での総加圧力P_2が定着ローラ２側の定着ローラ対での総加圧力P_1よりも大きく（$P_2 > P_1$）なる。従って、本実施例においても、第１実施例と同様の効果が得られる。

［第２発明］以下に第２発明の実施例を添付図面に基づいて説明する。

【００６７】本実施例に係る画像形成装置は前記第１発明の第１実施例に係る定着装置１を備えており、従って、ここでは第１発明に係る定着装置１と異なる点のみについて述べる。

【００６８】本実施例では、図５に示すように、定着ローラ２と定着ローラ１６は逆クラウン形状に成形されており、一方の定着ローラ２の両端部の外径ϕD_{1b}は$\phi 40$ｍｍに設定されており、該両端部の外径ϕD_{1b}と中央部の外径ϕD_{1a}との差を該定着ローラ２の逆クラウン量

a_1 と定義すると、$a_1 = \phi D_{1b} - \phi D_{1a} = 125\mu$ となっている。

【００６９】又、他方の定着ローラ１６の両端部の外径 ϕD_{1b} はφ４０mmに設定されており、該両端部の外径 ϕD_{1b} と中央部の外径 ϕD_{2a} との差を定着ローラ１６の逆クラウン量 a_2 と定義すると、$a_2 = \phi D_{2b} - \phi D_{2a} = 170\mu$ となっている。

【００７０】従って、本実施例では、定着ローラ２，１６の逆クラウン量 a_1，a_2 が記録材１２の進行方向（図５の矢印方向）に沿って大きくなる（$a_2 > a_1$）よう構成されている。このため、定着ローラ２が含まれる最初の定着ローラ対では記録材１２上の未定着現像剤像に大きなストレスをかけないで定着を行なうことができ、続いて定着ローラ１６を含む次の定着ローラ対では定着ローラ１６の逆クラウン量が更に大きい状態で定着が行なわれ、この結果、画像ズレ、特にベタ黒画像のズレを発生させることなく、安定した高画質画像を得ることができる。

［第３発明］次に、第３発明の実施例を図６に基づいて説明する。

【００７１】図６は第３発明の実施例に係る定着装置１の断面図であり、該定着装置１にお定着ローラ２の加圧ローラ３で構成される定着ローラ対と加圧ローラ１５と定着ローラ１６で構成される定着ローラ対の計２対の定着ローラ対が配設されているが、各定着ローラ対の定着ローラ２，１６の直径 ϕD_1，ϕD_2 が記録材１２の搬送方向（図６の左方向）に沿って大きくなる（$\phi D_2 > \phi D_1$）よう構成されている。具体的には、定着ローラ２，１６の直径 ϕD_1，ϕD_2 は、それぞれ $\phi D_1 = \phi 30$mm、$\phi D_2 = \phi 40$mmに設定されている。

【００７２】ところで、一般的に熱ローラ定着方式において、定着した記録材のカール発生の原因の１つに定着ローラの直径（曲率）が大きく関与しており、通常、定着ローラ直径が小さくて曲率の大きな定着ローラでは記録材のカール量は大きく、その逆に定着ローラ直径が大きくて曲率の小さな定着ローラでは記録材のカール量は小さい。

【００７３】而して、本実施例によれば、記録材１２が順次進むに従って、定着ローラ２，１６の直径が ϕD_1，ϕD_2 が順次大きくなる（曲率が順次小さくなる）ため、記録材１２のカール発生量を小さく抑えることができ、その結果、再生紙等を含めた多くの記録材１２に対する搬送性のラチチュードを拡大することができ、特に両面多重機能を含めた装置全体の大幅な信頼性向上を実現することができるという効果が得られる。

［第４発明］次に、第４発明の実施例を添付図面に基づいて説明する。

【００７４】＜第１実施例＞第４発明の第１実施例を図７に基づいて説明する。尚、図７は第１実施例に係る定着装置の断面図であり、本図においては、図１に示した定着装置と同一要素には同一符号を付している。

【００７５】本実施例では、一方の定着ローラ２には単一のハロゲンヒータ２５を設け、他方の定着ローラ１６には２本のハロゲンヒータ２６ａ，２６ｂを設けている。

【００７６】而して、一方の定着ローラ２の総熱容量 W_1 は単一のハロゲンヒータ２５によって決定され、そのワッテージ W_1 は４００Wであり、他方の定着ローラ１６総熱容量 W_2 は２本のハロゲンヒータ２６，２６ｂによって決定され、そのワッテージ W_2 は８００Wである。

【００７７】従って、本実施例では、定着ローラ２，１６の熱容量 W_1，W_2 が記録材１２の進行方向（図７の左方向）に沿って大きくなる（$W_2 > W_1$）よう構成されている。

【００７８】ところで、一般的に、熱ローラ定着方式において定着した記録材のカール発生の原因の１つに定着ローラの熱容量（具体的には、定着ローラと加圧ローラの少なくとも一方に内蔵されている熱源の熱容量、又は定着ローラの肉厚）が大きく関与しており、通常、定着ローラの熱容量が大きい場合（つまり、熱源のワッテージが大きい場合、或いは定着ローラの肉厚が大きい場合）には、記録材の受ける熱も大きくなり、熱による紙繊維の収縮及び熱による現像剤の収縮に伴うバイメタル作用が働いて記録材のカール量が大きくなる。特に急激な温度差の熱を与えた場合には、記録材のカール量は通常より大きくなり、逆に定着ローラの熱容量が小さい場合は、記録材のカール量が小さくなる。

【００７９】而して、本実施例によれば、記録材１２が順次進むに従って、定着ローラ２，１６の熱容量 W_1，W_2 が順次大きくなるため、定着ローラ２を含む最初の定着ローラ対において記録材１２に急激な熱を与えることがなく、最初の定着ローラ対では記録材１２に小さな熱量が与えられ、次の定着ローラ１６を含む定着ローラ対では大きな熱量が順次記録材１２へ与えられるため、記録材１２には急激な熱による大きなカールの発生はなく、記録材１２のカール量を小さく抑えることができ、その結果、再生紙等を含めた各種記録材１２に対する搬送性のラチチュードを拡大し、特に両面多重機能を含めた装置全体の大幅な信頼性向上を実現することができる。

【００８０】＜第２実施例＞次に、第４発明の第２実施例を図８に基づいて説明する。尚、図８は第２実施例に係る定着装置の断面図であり、本図においても、図１に示した定着装置と同一要素には同一符号を付している。

【００８１】本実施例では、定着ローラ２，１６の芯金の肉厚 t_1，t_2 が異なっており、一方の定着ローラ２の芯金の肉厚 t_1 は２mmに設定され、他方の定着ローラ１６の芯金の肉厚 t_2 は５mmに設定されている。つまり、本実施例では、定着ローラ２，１６の芯金の肉厚

t_1，t_2が記録材１２の進行方向（図８の左方向）に大きく（$t_1 > t_2$）なるよう構成されており、従って、前記第１実施例と同様に、定着ローラ２，１６の熱容量W_1，W_2が記録材１２の進行方向（図７の左方向）に沿って大きくなる（$W_2 > W_1$）よう構成されており、この結果第１実施例と同様の効果が得られる。

【００８２】

【発明の効果】以上の説明で明らかな如く、第１発明によれば、記録材が順次進むに従って、定着ローラと加圧ローラを互いに圧接するための総加圧力が順次大きくなるため、最初の定着ローラ対では記録材上の未定着現像剤像に大きなストレスをかけず、僅かに定着させ、続いて次の定着ローラ対では総加圧力が更に大きい状態で更に定着させることとなり、画像ズレ、特にベタ黒画像のズレを発生させることなく安定した高画質画像を得ることができる。

【００８３】第２発明によれば、記録材が順次進むに従って、定着ローラの逆クラウン量が順次大きくなっていくため、最初の定着ローラ対では記録材上の未定着現像剤像に大きなストレスをかけないで定着を行なうことができ、続いて次の定着ローラ対では定着ローラの逆クラウン量が更に大きい状態で定着が行なわれ、この結果、画像ズレ、特にベタ黒画像のズレを発生させることなく、安定した高画質画像を得ることができる。

【００８４】第３発明によれば、記録材が順次進むに従って、その定着ローラ直径が順次大きくなる（曲率が順次小さくなる）ため、記録材のカール発生量を小さく抑えることができ、その結果、再生紙等を含めた多くの記録材対する搬送性のラチチュードを拡大することができ、特に両面多重機能を含めた装置全体の大幅な信頼性向上を実現することができる。

【００８５】第４発明によれば、記録材が順次進むに従って、定着ローラの熱容量が順次大きくなるため、最初の定着ローラ対において記録材に急激な熱を与えることがなく、最初の定着ローラ対では記録材に小さな熱量が与えられ、次の定着ローラ対では大きな熱量が順次記録材へ与えられるため、記録材には急激な熱による大きなカールの発生はなく、記録材のカール量を小さく抑えることができ、その結果、再生紙等を含めた各種記録材に対する搬送性のラチチュードを拡大し、特に両面多重機能を含めた装置全体の大幅な信頼性向上を実現することができる。

【図面の簡単な説明】

【図１】第１発明の第１実施例に係る定着装置の断面図である。

【図２】画像形成装置の構成図である。

【図３】第１発明の第３実施例に係る定着装置の断面図である。

【図４】第１発明の第４実施例に係る定着装置の断面図である。

【図５】第２発明に係る定着装置の断面図である。

【図６】第３発明に係る定着装置の断面図である。

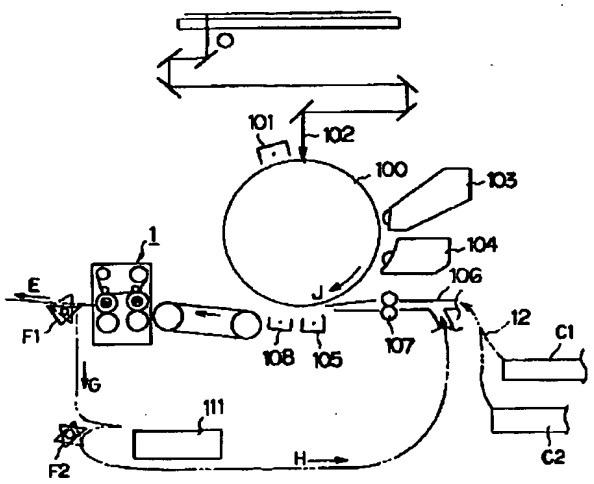
【図７】第４発明の第１実施例に係る定着装置の断面図である。

【図８】第４発明の第２実施例に係る定着装置の断面図である。

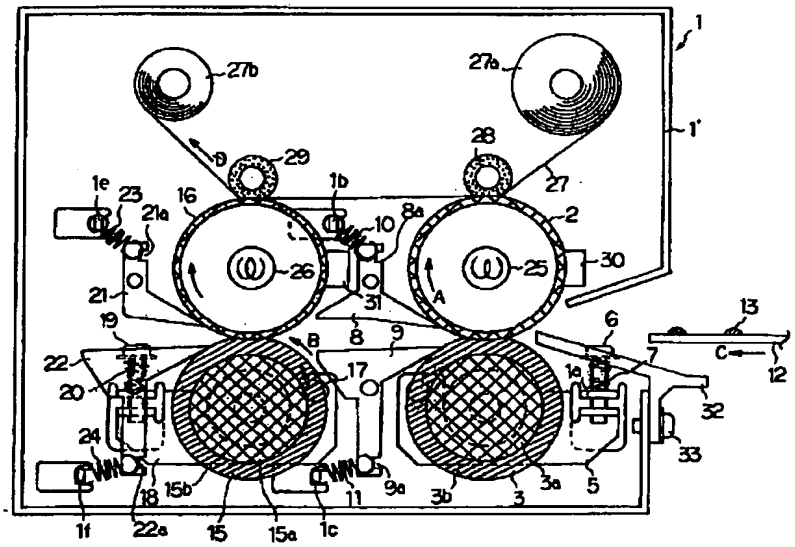
【符号の説明】

１	定着装置
２，１６	定着ローラ
３，１５	加圧ローラ
１２	紙（記録材）
７，２０	加圧バネ（加圧手段）
２５	ハロゲンヒータ（熱源）
２６ａ，２６ｂ	ハロゲンヒータ（熱源）

【図４】



【図１】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1a
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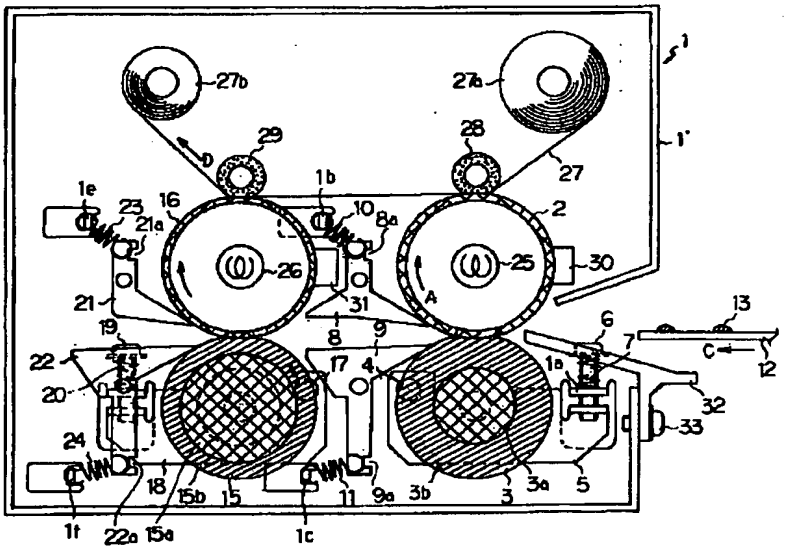
【図２】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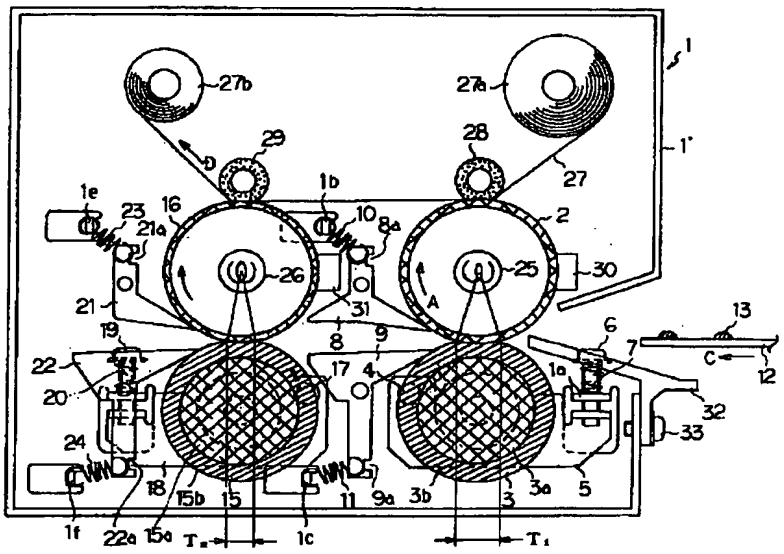
【図３】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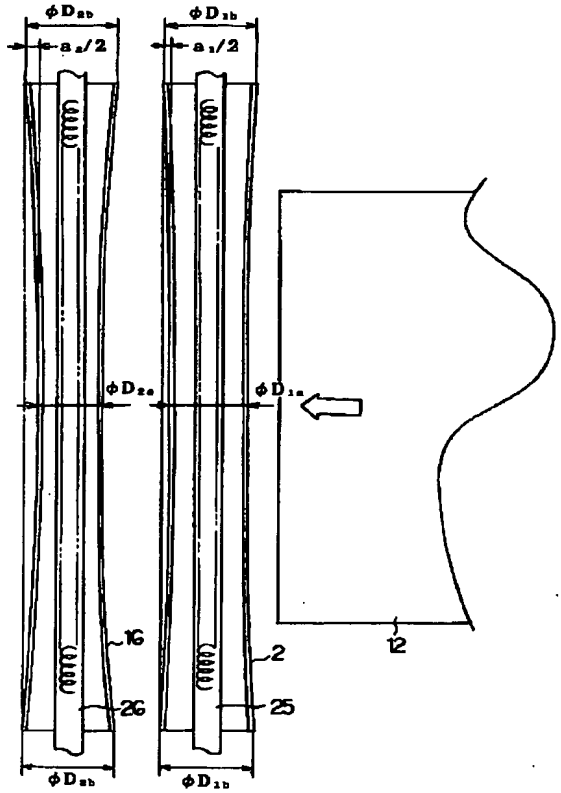
【図５】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φD1b
a1/2
φD2a
φD1a
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2
26
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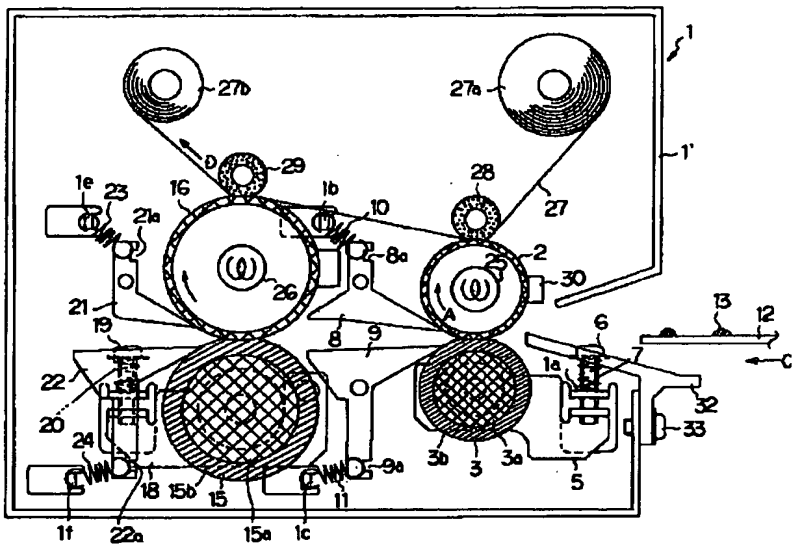
12
φD2b
φD1b

【図６】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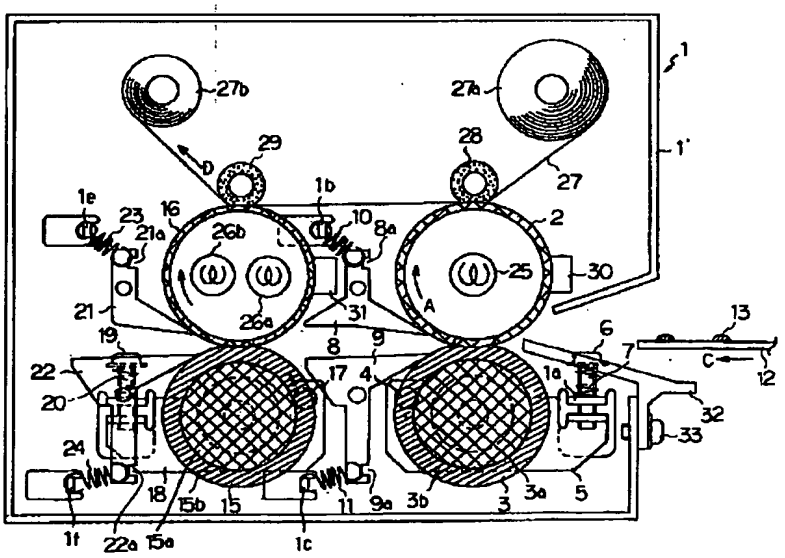
【図７】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【図８】

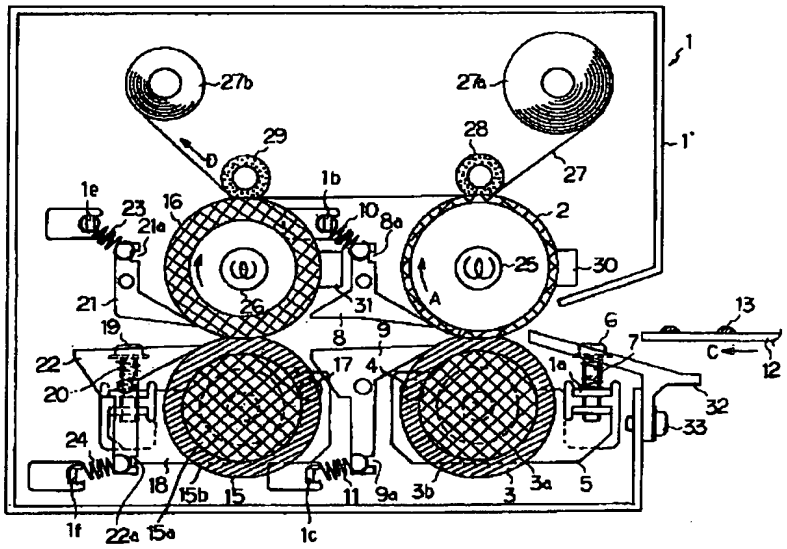
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IMAGE FORMING DEVICE

Patent Number: JP6258970
Publication date: 1994-09-16
Inventor(s): TANABE TAKESHI
Applicant(s): CANON INC
Requested Patent: ☐ JP6258970
Application Number: JP19930043417 19930304
Priority Number(s):
IPC Classification: G03G15/20
EC Classification:
Equivalents:

Abstract

PURPOSE:To provide an image forming device capable of obtaining a stable high quality image without deviation in the image, especially, in the black solid image.
CONSTITUTION:In the fixing device 1 of the image forming device, two pairs of fixing rollers or more are disposed along the advancing direction of a recording material 12 and a constitution that the total pressurizing force of the fixing rollers 2 and 16 of a pair of the fixing rollers is successively made larger in the advancing direction of the recording material 12 is adopted. Since the total pressurizing force of a pair of the fixing rollers is successively made larger in accordance with the advance of the recording material 12, in a pair of the first fixing rollers including the fixing roller 12, a large stress is not imparted to an unfixed developer image on the recording material 12, but the image is slightly fixed and then, further fixed in a state where the pressurizing force is large, in a pair of the next fixing rollers including the fixing roller 16. Thus, the stable high quality image can be obtained without generating the deviation in the image, especially, the black solid image.

* NOTICES *

CLAIMS

[Claim(s)]
[Claim 1] The image-formation equipment characterized by to constitute so that two or more pairs of said fixing roller pair arrange along the travelling direction of said record material and the total welding pressure of this fixing roller pair may become large one by one along the travelling direction of record material in image-formation equipment equipped with the anchorage device established through the record material which supports a non-established developer image between the fixing roller pairs which consist of the fixing roller which carried out the pressure welding, and which was arranged free [rotation], and a pressurization roller.
[Claim 2] The pressurization roller of each said fixing roller pair is image formation equipment according to claim 1 which a pressure welding is carried out to a fixing roller with a pressurization means, and is characterized by constituting so that the force of a pressurization means may become large one by one along the travelling direction of record material.
[Claim 3] The pressurization roller of each said fixing roller pair is image formation equipment according to claim 1 characterized by having consisted of rubber, and constituting so that the degree of hardness of the rubber of this pressurization roller may become large one by one along the travelling direction of record material.
[Claim 4] The pressurization roller of each said fixing roller pair is image formation equipment according to claim 1 characterized by having consisted of rubber, and constituting so that the thickness of the rubber of this pressurization roller may become small one by one along the travelling direction of record material.
[Claim 5] Image formation equipment according to claim 1 characterized by constituting so that the width of face of the nip formed between the fixing roller of each said fixing roller pair and a pressurization roller may become small one by one along the travelling direction of record material.
[Claim 6] The image-formation equipment characterized by to constitute so that two or more pairs of said fixing roller pair arrange along the travelling direction of said record material and the amount of the fixing roller of this fixing roller pair of reverse crown may become large one by one along a travelling direction in image-formation equipment equipped with the anchorage device established through the record material which supports a non-established developer image between the fixing roller pairs which consist of the fixing roller which carried out the pressure welding, and which was arranged free [rotation], and a pressurization roller.
[Claim 7] The image-formation equipment characterized by to constitute so that two or more pairs of said fixing roller pair arrange along the travelling direction of said record material and the diameter of the fixing roller of this fixing roller pair may become large one by one along the travelling direction of record material in image-formation equipment equipped with the anchorage device established through the record material which supports a non-established developer image between the fixing roller pairs which consist of the fixing roller which carried out the pressure welding, and which was arranged free [rotation], and a pressurization roller.
[Claim 8] The image-formation equipment characterized by to constitute so that two or more pairs of

said fixing roller pair arrange along the travelling direction of said record material and the heat capacity of the fixing roller of this fixing roller pair may become large one by one along the travelling direction of record material in image-formation equipment equipped with the anchorage device established through the record material which supports a non-established developer image between the fixing roller pairs which consist of the fixing roller which carried out the pressure welding, and which was arranged free [rotation], and a pressurization roller.

[Claim 9] Image formation equipment according to claim 1 characterized by constituting so that the heat capacity of the heat source of said fixing roller may become large one by one along the travelling direction of record material.

[Claim 10] Image formation equipment according to claim 1 characterized by constituting so that the thickness of said fixing roller may become large one by one along the travelling direction of record material.

[Translation done.]

* NOTICES *

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Industrial Application] This invention relates to image formation equipments, such as a copying machine, facsimile, and a laser beam printer.
[0002]
[Description of the Prior Art] Conventionally, with the image formation equipment which takes an electrophotography method, many heat fixing methods are used as a fixing method to the record material of a non-established developer.
[0003] The use number of sheets of a copy increases with the spread of copying machines, in addition, the copying machine with a quick copy process speed (copy speed) is required by the so-called progress of office laborsaving and OA(office automation)-izing of automation, and the above ultra high-speed machine has come [by the way, / in recent years] to spread by above high-speed machine and 100 more sheet/by copy-speed 50 sheet/especially.
[0004]
[Problem(s) to be Solved by the Invention] However, in order for the thickness and path to become large since fixable reservation is required of the heat fixing assembly in the above-mentioned high-speed machine or a ultra high-speed machine, and for heat capacity to also become large and to give still more sufficient heat energy for the fixing roller, the halogen heater of big WATTEJI was required for the fixing roller, wait time became long, the power consumption of equipment became large, and also it had the problem of also enlarging equipment.
[0005] And when image formation equipment was enlarged, the maintenance was complicated, it became still more difficult to secure [of an installation tooth space or a maintenance tooth space], it was small and a proposal of the easy high-speed machine of a maintenance and a ultra high-speed machine was desired.
[0006] Wait time is unnecessary and useless time amount especially for a user, and did not spoil fixable in the high-speed machine or the ultra high-speed machine, and an appearance of the secure-closing equipment which can shorten wait time was desired strongly.
[0007] Moreover, the function of a copying machine has multi-functionalized and many functions of a double-sided copy or a multiplex copy have been used by progress of automation in recent years. The high-speed machine and the ultra high-speed machine are standardly equipped with this double-sided multiplex function, and while a copy speed is a part for 20-40-sheet/, it is equipped by a standard equipment or option correspondence also with the low-speed machine. After carrying out image formation to record material, the stack of this record material is once carried out to Trey Nakama, and the process fixed to the rear face or the same field of that record material by carrying out image formation again is included in this both sides and multiplex copy actuation.
[0008] By the way, by the conventional heat fixing method, curl surely occurs in record material with heat and welding pressure. The curl direction and the amount of curl of the record material have large variation in an environment, a paper type or size, etc. In case Trey Nakama is made to do the receipt

stack of the record material, this record material can be round by curl, and cannot contain, or It was in the middle of conveyance, and the jam might be carried out, the re-imprint might occur under the effect of curl in the case of re-feeding at the time of the image formation of the 2nd side, or the imprint omission might occur [, and], and image quality might deteriorate. [that a point breaks]
[0009] Moreover, also when the record material which passed the fixing assembly was discharged outside the plane and contained by a sorter, a finisher, the tray, etc., poor receipt, a jam, etc. of this record material might be generated by curl.
[0010] As mentioned above, it was not easy to fully satisfy a double-sided multiplex function, for this reason, the curl prevention means of former versatility etc. was devised, but it could not say that all were enough but an appearance of the equipment which equipped the double-sided multiplex function that dependability with little curl is high was desired strongly.
[0011] Furthermore, recently, it becomes possible from the position of the ecology of earth environmental protection to begin to use recycled paper as copy paper for reservation of forest resources, in addition to reduce copy paper as much as possible on the front reverse side of paper, by the previous double-sided multiplex function, since image formation is possible, and many the double-sided copies and multiplex copies which use recycled paper are used increasingly.
[0012] however , it have the fault which be large by heat [in / since the directivity of fiber be uniform / the usual copy paper / whenever / orientation angle / which , as for a recycled paper , the paper fiber receive a damage by that down stream processing how many times , and the waist (rigidity) of paper be weak , and show the variation condition in the direction of the clearance eye of paper fiber further / be large , and / a heat fixing method] , and welding pressure , and be remarkably inferior in conveyance nature . [of the amount of curl] In addition, in the image formation equipment which has equipped the double-sided multiplex function, various faults resulting from the curl explained previously became more remarkable, and an appearance of the image formation equipment which raised the latitude of the dependability over the record material of many reliance including recycled paper etc. was desired strongly.
[0013] Therefore, the place made into the purpose of the 1st and 2nd invention is to offer the image formation equipment which can obtain image gap and the high-definition image stabilized without generating gap of a solid black image especially.
[0014] Moreover, the place made into the purpose of the 3rd and 4th invention can expand the latitude of the conveyance nature to the various record material which stopped the curl yield of record material small and includes recycled paper etc., and is to offer the image formation equipment which can raise dependability including especially a double-sided multiplex function.
[0015]
[Means for Solving the Problem] Between the fixing roller pairs which consist of the fixing roller which carried out the pressure welding of the 1st invention mutually, and was arranged free [rotation] that the above-mentioned purpose should be attained, and a pressurization roller In image formation equipment equipped with the anchorage device established through the record material which supports a non-established developer image Two or more pairs of said fixing roller pair are arranged along the travelling direction of said record material, and it is characterized [the] by constituting so that the total welding pressure of this fixing roller pair may become large one by one along the travelling direction of record material.
[0016] The 2nd invention arranges two or more pairs of said fixing roller pair along the travelling direction of said record material, and is characterized [the] by to constitute so that the amount of reverse crown of the fixing roller of this fixing roller pair may become large one by one along a travelling direction in image-formation equipment equipped with the anchorage device established through the record material which supports a non-established developer image between the fixing roller pairs which consist of the fixing roller which carried out the pressure welding, and which was arranged free [rotation], and a pressurization roller.
[0017] Between the fixing roller pairs which consist of the fixing roller which carried out the pressure welding of the 3rd invention mutually, and was arranged free [rotation], and a pressurization roller In

image formation equipment equipped with the anchorage device established through the record material which supports a non-established developer image Two or more pairs of said fixing roller pair are arranged along the travelling direction of said record material, and it is characterized [the] by constituting so that the diameter of the fixing roller of this fixing roller pair may become large one by one along the travelling direction of record material.
[0018] Between the fixing roller pairs which consist of the fixing roller which carried out the pressure welding of the 4th invention mutually, and was arranged free [rotation], and a pressurization roller In image formation equipment equipped with the anchorage device established through the record material which supports a non-established developer image Two or more pairs of said fixing roller pair are arranged along the travelling direction of said record material, and it is characterized [the] by constituting so that the heat capacity of the fixing roller of this fixing roller pair may become large one by one along the travelling direction of record material.
[0019]
[Function] The fixing roller is fabricated by the reverse crown configuration for Siwa generating prevention of record material, and it makes record material produce stress and he is trying to prevent generating of Siwa generally with the reverse crown configuration and the total welding pressure with a pressurization roller.
[0020] Moreover, when the degree of hardness of the rubber which constitutes a pressurization roller when the total welding pressure which carries out the pressure welding of a fixing roller and the pressurization roller is large (that is, the force of a pressurization means is large) is large, or when nip width of face is small, generating of the stress to record material becomes large, and it is hard to generate Siwa in record material.
[0021] By the way, the phenomenon of Siwa generating has the phenomenon of image gap, and the relation of a front flesh side. That is, although Siwa does not occur in record material when the rubber degree of hardness of a pressurization roller is large, or when the force of a pressurization means is large, the total welding pressure is large, and nip width of face is small, the non-established developer image on record material is disturbed, and especially, by the solid black image, the inclination becomes remarkable and it becomes the cause of image gap because stress starts on record material.
[0022] Since the total welding pressure for carrying out the pressure welding of a fixing roller and the pressurization roller of each other becomes large one by one as it **, and record material progresses one by one according to the 1st invention, In the first fixing roller pair, big stress is not applied to the non-established developer image on record material. You make it established slightly and it continues, and in the following fixing roller pair, you can make it further established in the condition that the total welding pressure is still larger, and image gap and the high-definition image stabilized without generating gap of a solid black image especially can be obtained.
[0023] Moreover, since according to the 2nd invention the amount of reverse crown of a fixing roller becomes large one by one as record material progresses one by one, It can be established without applying big stress to the non-established developer image on record material in the first fixing roller pair. Then, in the following fixing roller pair, fixing is performed in the condition that the amount of reverse crown of a fixing roller is still larger, consequently image gap and the high-definition image stabilized without generating gap of a solid black image especially can be obtained.
[0024] By the way, generally in a heat roller fixing method, the diameter (curvature) of a fixing roller is participating in one of the causes of curl generating of the fixed record material greatly, the amount of curl of record material is large in a fixing roller with a small fixing roller diameter and usually big curvature, and the amount of curl of record material is small in the fixing roller with a conversely large fixing roller diameter and small curvature.
[0025] The latitude of the conveyance nature to many record material which **(ed), could stop the curl yield of record material small since according to the 3rd invention a fixing roller diameter became large one by one as record material progresses one by one (curvature becomes small one by one), consequently includes recycled paper etc. can be expanded, and large improvement in dependability of the whole equipment including especially a double-sided multiplex function can be realized.

[0026] Generally to one of the causes of curl generating of the record material established in the heat roller fixing method, moreover, the heat capacity of a fixing roller the heat capacity of the heat source specifically built at least in one side of a fixing roller and a pressurization roller -- The thickness of a fixing roller is involving greatly. Or when the heat capacity of a fixing roller is large, in [that is, when / when WATTEJI of a heat source is large, or when the thickness of a fixing roller is large], usually The heat which record material receives also becomes large, the bimetal operation accompanying contraction of the paper fiber by heat and contraction of the developer by heat works, and the amount of curl of record material becomes large. When the heat of a rapid temperature gradient is given especially, the amount of curl of record material becomes larger than usual, and when the heat capacity of a fixing roller is conversely small, the amount of curl of record material becomes small.
[0027] Since the heat capacity of a fixing roller becomes large one by one as it **, and record material progresses one by one according to the 4th invention, Since rapid heat is not given to record material in the first fixing roller pair, a small heating value is given to record material in the first fixing roller pair and the big heating value in the following fixing roller pair is given to sequential record material, The latitude of the conveyance nature to the various record material which generating of the big curl by rapid heat does not have in record material, and could stop the amount of curl of record material small, consequently includes recycled paper etc. can be expanded, and large improvement in dependability of the whole equipment including especially a double-sided multiplex function can be realized.
[0028]
[Example]
The example of the 1st invention is explained below to [the 1st invention] based on an accompanying drawing.
[0029] <1st example> drawing 1 is the sectional view of the anchorage device 1 of the image formation equipment concerning this invention, and this anchorage device 1 has the pressurization roller 3 arranged by carrying out a pressure welding so that the nip of the fixing roller 2 which rotates in the direction of illustration arrow-head A, and this fixing roller 2 might be formed. In addition, the fixing roller 2 is supported free [rotation] by non-illustrated bearing.
[0030] It consists of metallic materials of aluminum or an iron system, and, for the thickness of the rodding, t1 and an outer diameter are [the above-mentioned fixing roller 2] phiD1. It is set up, respectively. And in order to prevent adhesion of a toner, coating of the front face of this fixing roller 2 is carried out by fluorine system resin, such as Teflon (trademark).
[0031] On the other hand, said pressurization roller 3 consists of rodding section 3a and rubber section 3b, the outer diameter is phiD1' and the t1' degree of hardness is set as Hs1 for the thickness of rubber section 3b, respectively. And this pressurization roller 3 is projection 1a and the spring force p1 which it is supported free [rotation] through non-illustrated bearing by the pressurization arm 5 which rotates a revolving shaft 4 as a core, and the other end of this pressurization arm 5 engaged with the screw 6, and were formed in a part of frame 1' of an anchorage device 1. It is energized with the pressurization spring 7 which it had. Therefore, in the pressurization roller 3, it is the total welding pressure P1. It is given, the pressure welding of this pressurization roller 3 is carried out to a fixing roller 2, and it is width of face T1 between fixing rollers 2. Nip is formed.
[0032] Moreover, the separation pawls 8 and 9 are formed in the fixing roller 2 and the pressurization roller 3, respectively, springs 10 and 11 are engaging with one edges 8a and 9a each of these separation pawls 8 and 9, respectively, the other end of each springs 10 and 11 is engaging with the fixed end 1b and 1c in an anchorage device 1, and the separation pawls 8 and 9 are in contact with the fixing roller 2 and the pressurization roller 3 by place constant pressure with this, respectively.
[0033] It ** and paper 12 is conveyed by the non-illustrated conveyance section from the right-hand side of drawing 1 in this anchorage device 1 to left-hand side. In addition, the non-established developer image 13 is formed on paper 12.
[0034] And the pressurization roller 15 and the fixing roller 16 are arranged in left-hand side by the anchorage device 1 along the conveyance direction of the above-mentioned paper 12. A rotation drive is carried out in the direction of illustration arrow-head B, a fixing roller 16 carries out the pressure

welding of the pressurization roller 15 to this pressurization roller 15, and nip is formed among both. Here, the fixing roller 16 is supported by non-illustrated bearing free [rotation].
[0035] The above-mentioned pressurization roller 15 consists of cylinder-like rodding section 15a and rubber section 15b, and t2' and a rubber degree of hardness are set [the outer diameter] as Hs2 for the thickness of phiD2' and rubber section 15b, respectively. and this pressurization roller 15 supports a revolving shaft 17 free [rotation] through non-illustrated bearing on the pressurization arm 18 rotated as a core -- having -- **** -- the other end of this pressurization arm 18 -- a screw 19 -- being engaged -- frame 1' of an anchorage device 1 -- a part of 1d of projections and spring force p2 It is energized with the pressurization spring 20 which it had. Therefore, in the pressurization roller 15, it is the total welding pressure P2. It is given, the pressure welding of this pressurization roller 15 is carried out to a fixing roller 16, and it is width of face T2 between fixing rollers 16. Nip is formed.
[0036] On the other hand, it is constituted like said fixing roller 2, and consists of metallic materials of aluminum or an iron system, and, for the thickness of the rodding, t2 and an outer diameter are [a fixing roller 16] phiD2. It is set up.
[0037] Moreover, the separation pawls 21 and 22 are formed in the pressurization roller 15 and the fixing roller 16, respectively, springs 23 and 24 are engaging with one edges 21a and 22a each of the separation pawls 21 and 22, respectively, the other end of each spring 23 and 24 is engaging with the fixed end 1e and 1f in an anchorage device 1, and each separation pawls 21 and 22 are in contact with the pressurization roller 15 and the fixing roller 16 by place constant pressure with this, respectively.
[0038] Furthermore, the halogen heaters 25 and 26 prolonged in the longitudinal direction are arranged in the interior of a fixing roller 2 and a fixing roller 16, respectively, and halogen heaters 25 and 26 are W1 and W2, respectively. It has WATTEJI, the heat generated in them acts on the non-established developer image 13 on the paper 12 which runs in the direction of illustration arrow-head C through fixing rollers 2 and 16, and it is fixed to the developer image 13 on paper 12.
[0039] Moreover, the web 27 which carried out oil impregnation of the oil of the specified quantity is in contact with the fixing roller 2 and the fixing roller 16 through the web rollers 28 and 29, and the residual developer on the front face of fixing rollers 2 and 16 is removed by the web 27. A web 27 is sent out more quantitatively than supply side 27a, and is rolled round by rolling-up side 27b in the direction of an illustration D arrow head, and generating of offset is prevented by this web 27.
[0040] Furthermore, in order to control the temperature on each front face to the fixing roller 2 and fixing roller 16 in which halogen heaters 25 and 26 are formed, the thermistors 30 and 31 which are temperature detectors are made to contact fixing rollers 2 and 16 by place constant pressure.
[0041] On the other hand, the inlet-port guide 32 for carrying out guidance conveyance is attached in frame 1' of an anchorage device 1 on the screw 33 in paper 12 to the fixing roller 2 side, and generating of Siwa of the paper 12 by the right-hand side fixing roller pair (a fixing roller 2 and pressurization roller 3) is prevented to it by making paper 12 contact and advance to a fixing roller 2 side.
[0042] Here, image formation equipment equipped with an anchorage device 1 is explained based on drawing 2 . In addition, drawing 2 is the block diagram of an image formation equipment important section.
[0043] In drawing 2 , 100 is a photoconductor drum which is the cylinder-like latent-image support which rotates in the direction of arrow-head J, and the primary electrification machine 101 is arranged above this photoconductor drum 100.
[0044] It ** and the front face of a photoconductor drum 100 is uniformly charged with the primary electrification vessel 101, this front face is exposed by the exposure beam 102, and an electrostatic latent image is formed on the front face of a photoconductor drum 100. And this electrostatic latent image is developed by either or the both sides of the developer 103,104 by which sequential arrangement was carried out as a toner image in the hand of cut of a photoconductor drum 100. In addition, since the nonmagnetic chromatic color toner is contained by one developer 103 and the magnetic black toner is contained by the developer 104 of another side, a multicolor copy is possible.
[0045] The above-mentioned toner image arrives at the imprint section on which the imprint electrification machine 105 of the lower part of this photoconductor drum 100 was arranged with

rotation of a photoconductor drum 100. the imprint section -- or [any of cassettes C1 and C2] -- from -- the record material 12 taken out alternatively -- the conveyance way 106 -- passing -- going on -- this record material 12 -- a resist roller pair -- it is controlled by 107, and the toner image and timing on a photoconductor drum 100 are doubled, it is conveyed, and a toner image is imprinted with the imprint electrification vessel 105 on this record material 12.
[0046] Next, with the separation electrification vessel 108 arranged together with said imprint electrification machine 105, the charge given to the record material 12 at the time of an imprint is discharged, and it dissociates from a photoconductor drum 100, and the record material 12 is conveyed by the anchorage device 1, and receives fixing of a toner image here.
[0047] What is necessary is to set a flapper F1 as the location shown in drawing 2 as a continuous line, to convey the record material 12 in the direction of arrow-head E as it is, and just to discharge outside the plane, in performing an one side copy in these above image formation equipments.
[0048] On the other hand, in case both sides or a multiplex copy is performed, it is set as the location which shows a flapper F1 to drawing 2 with a two-dot chain line, and the record material 12 which came out of the anchorage device 1 is conveyed in the direction of arrow-head G. And it is made sense to which the record material 12 from the this middle tray 111 once setting it as the location where a flapper F2 is further shown in drawing 2 as a continuous line in a double-sided copy and containing this record material 12 to Trey Nakama 111 is taken out, this is conveyed along with an arrow head H, and the second page counters a photoconductor drum 100 in this record material 12, and the conveyance way 106 is supplied again. The toner image currently formed in the photoconductor drum 100 by this time is imprinted on the record material 12 by the same technique as the above, it switches to the location which will show a flapper F1 to drawing 2 as a continuous line by the time this record material 12 passes an anchorage device 1, the record material 12 which fixing ended is conveyed in the direction of illustration arrow-head E, and it discharges outside the plane.
[0049] Moreover, what is necessary is to advance the record material 12 which sets a flapper F2 as drawing 2 in the location shown with a two-dot chain line, and advances a multiplex copy in the direction of arrow-head G after the first-page copy termination in being **** in the direction of illustration arrow-head H as it is, to supply this to the conveyance way 106, and just to perform image formation actuation of the 2nd henceforth like the above on one side of the record material 12.
[0050] by the way, this example -- setting -- the total welding pressure P1 in the fixing roller pair by the side of a fixing roller 2 Spring force p1 of the pressurization spring 7 It is determined, is set as P1 =p1 =20kg, and is the total welding pressure P2 in the fixing roller pair by the side of a fixing roller 16. Spring force p2 of the pressurization spring 20 It is determined and is set as P2 =p2 =30kg.
[0051] Therefore, the total welding pressure [in / it consists of this examples so that the total welding pressure in a fixing roller pair may become large one by one along the travelling direction of the record material 12, and / the fixing roller pair by the side of a fixing roller 16] P2 The total welding pressure P2 in the fixing roller pair by the side of a fixing roller 2 It is set up greatly (P2 > P1).
[0052] By the way, when the total welding pressure which generally carries out the pressure welding of a fixing roller and the pressurization roller is large (that is, the force of a pressurization means is large), generating of the stress to record material becomes large, and it is hard to generate Siwa in record material.
[0053] On the other hand, the phenomenon of Siwa generating has the phenomenon of image gap, and the relation of a front flesh side. That is, when the force of a pressurization means is large and the total welding pressure is large, the non-established developer image on record material is disturbed, and especially, by the solid black image, the inclination becomes remarkable and it becomes the cause of image gap because stress starts on record material.
[0054] The total welding pressure [according to / ** and / this example / in / as mentioned above / the fixing roller pair by the side of a fixing roller 16] P2 The total welding pressure P2 in the fixing roller pair by the side of a fixing roller 2 Since it is set up greatly (P2 > P1), In the first fixing roller pair containing a fixing roller 2, big stress is not applied to the non-established developer image on the record material 12. In the following fixing roller pair which is fixed slightly and contains a fixing roller

16 continuously, you can make it further established with still bigger welding pressure, and image gap and the high-definition image stabilized without generating gap of a solid black image especially can be obtained.
[0055] The <2nd example>, next the 2nd example of this invention are similarly explained using drawing 1 .
[0056] In the anchorage device 1 concerning this example, only the degrees of hardness Hs1 and Hs2 of the rubber sections 3b and 15b of the pressurization roller 3 and the pressurization roller 15 differ, and others are the same as that of said 1st example.
[0057] Generally, it is known that the total welding pressure will also become large in proportion to the magnitude of a rubber degree of hardness.
[0058] The total welding pressure P1 in the fixing roller pair by the side of a fixing roller 2 in this example It is determined by the degree of hardness Hs1 of rubber section 3b of the pressurization roller 3, and is 1= 40 degree of Hs(es). the total pressurization P2 in the fixing roller pair by the side of a fixing roller 16 Since it is determined by the degree of hardness Hs2 of rubber section 15b of the pressurization roller 15 and is 2= 50 degree (> Hs1) of Hs(es), It is the total welding pressure P2 in the fixing roller pair by the side of a fixing roller 16 like said 1st example. The total welding pressure P1 in the fixing roller pair by the side of a fixing roller 2 It becomes large (P2 > P1). Therefore, also in this example, the same effectiveness as the 1st example is acquired.
[0059] The 3rd example of <3rd example> this invention is explained according to drawing 3 .
[0060] this example -- starting -- an anchorage device -- one -- setting -- pressurization -- a roller -- three -- pressurization -- a roller -- 15 -- each -- rubber -- the section -- three -- b -- 15 -- b -- thickness -- t -- one -- ' -- t -- two -- ' -- differing -- others -- the -- one -- an example -- starting -- an anchorage device -- one -- being the same .
[0061] It is known that an apparent rubber degree of hardness will become large, and the total welding pressure of the pressurization roller which consists of rubber will generally also become large like the thickness of rubber being small (thin).
[0062] The total welding pressure [in / it ** and / at this example / the fixing roller by the side of a fixing roller 2] P1 The degree of hardness of the appearance of rubber section 3b of the pressurization roller 3, That is, thickness t1' of rubber section 3b is determined, and it is t1'=7mm. The total welding pressure P2 in the fixing roller by the side of a fixing roller 16 Since the degree of hardness of the appearance of rubber section 15b of the pressurization roller 15, i.e., thickness t2' of rubber section 15b, is determined and it is set as t2'=5mm (<t1'), It is the total welding pressure P2 in the fixing roller pair by the side of a fixing roller 16 like said 1st and 2nd examples. The total welding pressure P1 in the fixing roller pair by the side of a fixing roller 2 It becomes large (P2 > P1). Therefore, also in this example, the same effectiveness as the 1st example is acquired.
[0063] The 4th example of <4th example> this invention is explained based on drawing 4 .
[0064] The width of face T1 of the nip produced in this example with the pressure welding of a fixing roller 2, the pressurization roller 3 and a fixing roller 16, and the pressurization roller 15, and T2 It is accepted and a difference and others are the same as that of the anchorage device 1 concerning the 1st example.
[0065] If the width of face of the nip between the fixing roller in a fixing roller pair and a pressurization roller is generally small, it is known that the total welding pressure will become large.
[0066] The total welding pressure [in / it ** and / at this example / the fixing roller pair by the side of a fixing roller 2] P1 is the nip width of face T1. It is determined and is set as T1 =5mm. The total welding pressure P2 in the fixing roller pair by the side of a fixing roller 16 Nip width of face T2 Since it is determined and is set as T2 =3mm (<T1), It is the total welding pressure P2 in the fixing roller pair by the side of a fixing roller 16 like said the 1st thru/or 3rd example. The total welding pressure P1 in the fixing roller pair by the side of a fixing roller 2 It becomes large (P2 > P1). Therefore, also in this example, the same effectiveness as the 1st example is acquired.
The example of the 2nd invention is explained below to [the 2nd invention] based on an accompanying drawing.

[0067] The image formation equipment concerning this example describes only a different point from the anchorage device 1 which is equipped with the anchorage device 1 concerning the 1st example of said 1st invention, therefore is applied to the 1st invention here.
[0068] In this example, as shown in drawing 5 , the fixing roller 2 and the fixing roller 16 are fabricated by the reverse crown configuration, outer-diameter phiD1b of the both ends of one fixing roller 2 is set as phi40mm, and it is the amount a1 of reverse crown of this fixing roller 2 about the difference of outer-diameter phiD1b of these both ends, and outer-diameter phiD1a of a center section. If a definition is given, it is a1 =phiD1 b-phi D1a=125micro.
[0069] Moreover, it is set as phi40mm and outer-diameter phiD1b of the both ends of the fixing roller 16 of another side is the amount a2 of reverse crown of a fixing roller 16 about the difference of outer-diameter phiD1b of these both ends, and outer-diameter phiD2a of a center section. If a definition is given, it is a2 =phiD2b-phiD2a=170micro.
[0070] therefore -- this example -- the amount a1 of reverse crown of fixing rollers 2 and 16, and a2 it becomes large along the travelling direction (the direction of an arrow head of drawing 5) of the record material 12 (a2 > a1) -- it needs -- it is constituted. For this reason, at the first fixing roller pair in which a fixing roller 2 is contained, by the following fixing roller pair which can be established without applying big stress to the non-established developer image on the record material 12, and contains a fixing roller 16 continuously, fixing is performed in the condition that the amount of reverse crown of a fixing roller 16 is still larger, consequently image gap and the high-definition image stabilized without generating gap of a solid black image especially can be obtained.
The example of the [3rd invention], next the 3rd invention is explained based on drawing 6 .
[0071] Although a total of two pairs of fixing roller pairs of a fixing roller pair which consist of the fixing roller pair and the pressurization roller 15 which drawing 6 is the sectional view of the anchorage device 1 concerning the example of the 3rd invention, and are constituted from a pressurization roller 3 of a fixing roller 2 by this anchorage device 1, and a fixing roller 16 is arranged diameter phiD1 of the fixing rollers 2 and 16 of each fixing roller pair, and phiD2 it becomes large along the conveyance direction (left of drawing 6) of the record material 12 (phiD2 >phiD1) -- it needs -- it is constituted. Specifically, they are diameter phiD1 of fixing rollers 2 and 16, and phiD2. It is set as phiD1 =phi30mm and phiD2 =phi40mm, respectively.
[0072] By the way, generally, the diameter (curvature) of a fixing roller is participating in one of the causes of curl generating of the fixed record material greatly, the amount of curl of record material is large in a heat roller fixing method, in a fixing roller with a small fixing roller diameter and usually big curvature, and the amount of curl of record material is small in the fixing roller with a conversely large fixing roller diameter and small curvature.
[0073] The diameter of fixing rollers 2 and 16 is phiD1 and phiD2 as it **, and the record material 12 progresses one by one according to this example. Since it becomes large one by one (curvature becomes small one by one), The latitude of the conveyance nature to many record material 12 which could stop the curl yield of the record material 12 small, consequently includes recycled paper etc. can be expanded, and the effectiveness that the large improvement in dependability of the whole equipment including especially a double-sided multiplex function is realizable is acquired.
The example of the [4th invention], next the 4th invention is explained based on an accompanying drawing.
[0074] The 1st example of the 4th invention of <the 1st example> is explained based on drawing 7 . In addition, drawing 7 is the sectional view of the anchorage device concerning the 1st example, and gives the same sign to the same element as the anchorage device shown in drawing 1 in this Fig.
[0075] In this example, the single halogen heater 25 was formed in one fixing roller 2, and two halogen heaters 26a and 26b are formed in the fixing roller 16 of another side.
[0076] It ** and is the total heat capacity W1 of one fixing roller 2. It is determined by the single halogen heater 25 and is the WATTEJI W1. It is 400W and is the fixing roller 16 total heat capacity W2 of another side. It is determined by two halogen heaters 26 and 26b, and is the WATTEJI W2. It is 800W.

[0077] therefore -- this example -- the heat capacity W1 of fixing rollers 2 and 16, and W2 it becomes large along the travelling direction (left of drawing 7) of the record material 12 (W2 > W1) -- it needs -- it is constituted.
[0078] Generally to one of the causes of curl generating of the record material established in the heat roller fixing method, by the way, the heat capacity of a fixing roller the heat capacity of the heat source specifically built at least in one side of a fixing roller and a pressurization roller -- The thickness of a fixing roller is involving greatly. Or when the heat capacity of a fixing roller is large, in [that is, when / when WATTEJI of a heat source is large, or when the thickness of a fixing roller is large], usually The heat which record material receives also becomes large, the bimetal operation accompanying contraction of the paper fiber by heat and contraction of the developer by heat works, and the amount of curl of record material becomes large. When the heat of a rapid temperature gradient is given especially, the amount of curl of record material becomes larger than usual, and when the heat capacity of a fixing roller is conversely small, the amount of curl of record material becomes small.
[0079] It is the heat capacity W1 of fixing rollers 2 and 16, and W2 as it **, and the record material 12 progresses one by one according to this example. Since it becomes large one by one, Rapid heat is not given to the record material 12 in the first fixing roller pair containing a fixing roller 2. Since a small heating value is given to the record material 12 in the first fixing roller pair and the big heating value in the fixing roller pair containing the following fixing roller 16 is given to the sequential record material 12, There is no generating of the big curl by rapid heat in the record material 12, and the amount of curl of the record material 12 can be stopped small. Consequently, the latitude of the conveyance nature to the various record material 12 including recycled paper etc. can be expanded, and large improvement in dependability of the whole equipment including especially a double-sided multiplex function can be realized.
[0080] The <2nd example>, next the 2nd example of the 4th invention are explained based on drawing 8 . In addition, drawing 8 is the sectional view of the anchorage device concerning the 2nd example, and gives the same sign to the same element as the anchorage device shown in drawing 1 also in this Fig.
[0081] At this example, it is the thickness t1 of rodding of fixing rollers 2 and 16, and t2. It differs and is the thickness t1 of rodding of one fixing roller 2. It is set as 2mm and is the thickness t2 of rodding of the fixing roller 16 of another side. It is set as 5mm. that is, -- this example -- the thickness t1 of rodding of fixing rollers 2 and 16, and t2 It is constituted. large (t1 > t2) to the travelling direction (left of drawing 8) of the record material 12 -- it needs -- therefore, said 1st example -- the same -- the heat capacity W1 of fixing rollers 2 and 16, and W2 it becomes large along the travelling direction (left of drawing 7) of the record material 12 (W2 > W1) -- it needs -- it is constituted and, as a result, the same effectiveness as the 1st example is acquired.
[0082]
[Effect of the Invention] Since the total welding pressure for carrying out the pressure welding of a fixing roller and the pressurization roller of each other becomes large one by one by the above explanation according to the 1st invention as record material progresses one by one so that clearly, In the first fixing roller pair, big stress is not applied to the non-established developer image on record material. You make it established slightly and it continues, and in the following fixing roller pair, you can make it further established in the condition that the total welding pressure is still larger, and image gap and the high-definition image stabilized without generating gap of a solid black image especially can be obtained.
[0083] Since according to the 2nd invention the amount of reverse crown of a fixing roller becomes large one by one as record material progresses one by one, It can be established without applying big stress to the non-established developer image on record material in the first fixing roller pair. Then, in the following fixing roller pair, fixing is performed in the condition that the amount of reverse crown of a fixing roller is still larger, consequently image gap and the high-definition image stabilized without generating gap of a solid black image especially can be obtained.
[0084] Since according to the 3rd invention the fixing roller diameter becomes large one by one as record material progresses one by one (curvature becomes small one by one), the latitude of the

conveyance nature in which many which could stop the curl yield of record material small, consequently include recycled paper etc. carry out a record material pair can be expanded, and large improvement in dependability of the whole equipment including especially a double-sided multiplex function can be realized.

[0085] Since according to the 4th invention the heat capacity of a fixing roller becomes large one by one as record material progresses one by one, Since rapid heat is not given to record material in the first fixing roller pair, a small heating value is given to record material in the first fixing roller pair and the big heating value in the following fixing roller pair is given to sequential record material, The latitude of the conveyance nature to the various record material which generating of the big curl by rapid heat does not have in record material, and could stop the amount of curl of record material small, consequently includes recycled paper etc. can be expanded, and large improvement in dependability of the whole equipment including especially a double-sided multiplex function can be realized.

[Translation done.]

* NOTICES *

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1] It is the sectional view of the anchorage device concerning the 1st example of the 1st invention.
[Drawing 2] It is the block diagram of image formation equipment.
[Drawing 3] It is the sectional view of the anchorage device concerning the 3rd example of the 1st invention.
[Drawing 4] It is the sectional view of the anchorage device concerning the 4th example of the 1st invention.
[Drawing 5] It is the sectional view of the anchorage device concerning the 2nd invention.
[Drawing 6] It is the sectional view of the anchorage device concerning the 3rd invention.
[Drawing 7] It is the sectional view of the anchorage device concerning the 1st example of the 4th invention.
[Drawing 8] It is the sectional view of the anchorage device concerning the 2nd example of the 4th invention.
[Description of Notations]
1 Anchorage Device
2 16 Fixing roller
3 15 Pressurization roller
12 Paper (Record Material)
7 20 Pressurization spring (pressurization means)
25 Halogen Heater (Heat Source)
26a, 26b Halogen heater (heat source)

[Translation done.]